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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PATDOCTC@fr.com

Office Action Summary

Application No.

10/578,854

Applicant(s)

BRUNNER ET AL.

Examiner

W. Wendy Kuo

Art Unit

2826

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 February 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20, 24-28 and 31-40 is/are pending in the application.
- 4a) Of the above claim(s) 24-26 and 38 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 9 and 31-37 is/are allowed.
- 6) ☒ Claim(s) 1-8, 10-20, 27, 28, 39 and 40 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 May 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-848)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 01/30/2009; 02/23/2009
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(c), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(c) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 23 February 2009 has been entered.
2. Claims 1-20, 24-28, and 31-40 are pending. Claims 24-26 and 38 stand withdrawn from further consideration as being directed to a non-elected invention.

Drawings

3. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the multiple radiation-emitting and/or radiation receiving semiconductor components and the injection channel led through each of the multiple semiconductor components recited in claim 9 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must

be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

4. The disclosure is objected to because of the following informalities: reference numeral 12 describes both an external electrical lead (at page 6, paragraph 3) and a thick plastic film (at page 8, paragraph 2). Appropriate correction is required.

Claim Objections

5. **Claim 20 is objected to** under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 20 recites the same limitations as those recited in claim 6, the claim from which it depends. It is noted that while the intention to cancel claim 20 was stated in the remarks filed on 23 February 2009 (at page 9, paragraph 3), the claim was not accordingly cancelled from the listing of claims filed with the remarks.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

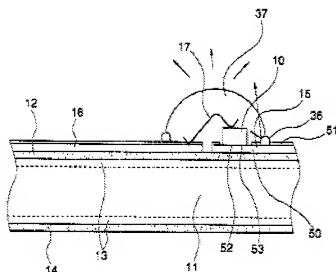
8. Claims 1, 7, 8, 39, and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakamoto et al. (US 6,489,637) (hereinafter Sakamoto) in view of Steffen (US 5,147,982) (hereinafter Steffen).

9. **With respect to claim 1**, Sakamoto (e.g. Figure 2) teaches a radiation-emitting and/or radiation-receiving semiconductor component comprising:

- A radiation-emitting and/or radiation-receiving semiconductor chip 10;
- A molded plastic body 37, ***made of a silicone molding compound*** (column 7, lines 48-51), which is at least partially transmissive to an electromagnetic radiation to be emitted and/or received by the semiconductor component (column 7, lines 44-49) and by which the semiconductor chip 10 is at least partially overmolded; and

- External electrical leads (15, 16) that are electrically connected to electrical contact areas of the semiconductor chip (column 5, lines 56-67),
- Wherein the semiconductor chip is mounted on a flexible lead frame (column 6, lines 47-50)

FIG. 2



Sakamoto fails to teach that the flexible lead frame comprises *a carrier film that comprises at least a plastic film and a metal film, and wherein the plastic film has an opening and the semiconductor chip is positioned in the opening and directly contacts the metal film.*

Steffen (e.g. Figure 6) teaches a flexible lead frame (10, 20) comprises a carrier film that comprises at least a plastic film 20 (column 4, lines 1-3) and a metal film 10 (column 3, line 46), and wherein the plastic film has an opening and the semiconductor chip 26 is positioned in the opening and directly contacts the metal film in order to improve the reliability of an encapsulated integrated circuit assembly (column 1, lines 10-11 and lines 60-61) by preventing the flow of a

protective resin between conductors (column 1, lines 48-51; column 5, lines 28-32) while providing a fabrication method that is easy to implement (column 1, lines 63-64).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the semiconductor component of Sakamoto with the flexible lead frame of Steffen for the benefit of improving the reliability of an encapsulated integrated circuit assembly by preventing the flow of a protective resin between conductors while providing a fabrication method that is easy to implement.

With respect to claims 7 and 8, Sakamoto as modified by Steffen teaches all of the limitations of claim 1 above.

Sakamoto as modified by Steffen fails to specify the footprint dimension or the component height. However, differences in footprint dimension/component height will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such dimensions are critical. A change in size is generally recognized as being within the level of ordinary skill in the art. *In re Rose*, 105 USPQ 237 (CCPA 1955).

It is noted that the specification contains no disclosure of either the critical nature of the claimed curing time or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen dimensions or upon another variable recited in the claim, the applicant must show that the chosen specified variables are critical. *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

Since the applicant has not established the criticality of the footprint dimension/component height, it would have been obvious to one of ordinary skill in the art at the

time of the invention to use these values in the semiconductor component of Sakamoto as modified by Steffen.

With respect to claim 39, Sakamoto (e.g. Figure 2) teaches that the molded plastic body is formed of a single piece of plastic.

With respect to claim 40, Sakamoto (e.g. Figure 2) teaches a radiation-emitting and/or radiation-receiving semiconductor component comprising:

- A radiation-emitting and/or radiation-receiving semiconductor chip 10;
- A molded plastic body 37, *made of a silicone molding compound* (column 7, lines 48-51), which is at least partially transmissive to an electromagnetic radiation to be emitted and/or received by the semiconductor component (column 7, lines 44-49) and by which the semiconductor chip 10 is at least partially overmolded; and
- External electrical leads (15, 16) that are electrically connected to electrical contact areas of the semiconductor chip (column 5, lines 56-67),
- Wherein the semiconductor chip is mounted on a flexible lead frame (column 6, lines 47-50)

Sakamoto fails to teach that the flexible lead frame comprises a plastic material, and *wherein the semiconductor chip is in direct contact with a metallic portion of the lead frame through the plastic material*. Steffen (e.g. Figure 6) teaches a flexible lead frame (10, 20) that comprises a plastic material 20 (column 4, lines 1-3), and wherein the semiconductor chip 26 is in direct contact with a metallic portion 10 of the lead frame through the plastic material 20 in order to improve the reliability of an encapsulated integrated circuit assembly (column 1, lines 10-11 and lines 60-61) by preventing the flow of a protective resin between conductors (column

1, lines 48-51; column 5, lines 28-32) while providing a fabrication method that is easy to implement (column 1, lines 63-64).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the semiconductor component of Sakamoto with the flexible lead frame of Steffen for the benefit of improving the reliability of an encapsulated integrated circuit assembly by preventing the flow of a protective resin between conductors while providing a fabrication method that is easy to implement.

10. Claims 2-4, 10-12, 27, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakamoto in view of Steffen, and further in view of Bank et al. (US 3,971,747) (hereinafter Bank).

With respect to claim 2, Sakamoto as modified by Steffen teaches all of the limitations of claim 1 above.

Sakamoto as modified by Steffen fails to teach that the silicone molding compound has a curing time of 10 minutes or less. Bank teaches that a curing time of about 30 minutes or less is preferred (column 11, lines 2-6) in order to provide an improved silicone-epoxy molding compound (column 1, lines 42-48). Moreover, differences in curing time will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such curing time is critical. “Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the workable ranges by routine experimentation.” *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

It is noted that the specification contains no disclosure of either the critical nature of the claimed curing time or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen dimensions or upon another variable recited in the claim, the applicant must show that the chosen specified variables are critical. *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

Since the applicant has not established the criticality of the silicone molding compound curing time, and this curing time has been in common use in similar devices in the art (e.g. Nakamura et al., JP 08335719 abstract), it would have been obvious to one of ordinary skill in the art at the time of the invention to use these values in the semiconductor component of Sakamoto as modified by Steffen.

With respect to claim 3, Sakamoto as modified by Steffen teaches all of the limitations of claim 1 above.

Sakamoto as modified by Steffen fails to teach that the silicone molding compound has a hardness when cured of 65 Shore D or more. Bank teaches that a silicone molding compound has a hardness when cured of 65 Shore D or more (column 17, lines 1-11 and 20-23) in order to provide an improved molding compound with better humidity resistance in electrical insulation (column 1, lines 20-24 and 47-48).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the semiconductor component of Sakamoto as modified by Steffen with the silicone molding compound of Bank for the benefit of improving the humidity resistance in electrical insulation.

With respect to claim 4, Sakamoto as modified by Steffen teaches all of the limitations of claim 1 above.

Sakamoto as modified by Steffen fails to teach that the silicone molding compound is a silicone composite material. Bank teaches a silicone molding compound that is a silicone composite material in order to provide an improved molding compound with better humidity resistance in electrical insulation (column 1, lines 20-24 and 47-48).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the semiconductor component of Sakamoto as modified by Steffen with the silicone molding compound of Bank for the benefit of improving the humidity resistance in electrical insulation.

With respect to claim 10, Bank teaches that the silicone molding compound has a hardness when cured of 65 Shore D or more (column 17, lines 1-11 and 20-23).

With respect to claims 11 and 12, Bank teaches that the silicone molding compound is a silicone composite material (column 1, lines 20-24 and 42-43).

With respect to claim 27, Sakamoto as modified by Steffen teaches all of the limitations of claim 1 above.

Sakamoto as modified by Steffen fails to teach that the silicone molding compound comprises an inorganic filling compound. Bank teaches that a silicone molding compound comprises an inorganic filling compound (column 11, lines 44-67) in order to provide an improved molding compound with better humidity resistance in electrical insulation (column 1, lines 20-24 and 47-48).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the semiconductor component of Sakamoto as modified by Steffen with the silicone molding compound of Bank having an inorganic filling compound for the benefit of improving the humidity resistance in electrical insulation.

With respect to claim 28, Bank teaches that the filling compound comprises at least one of TiO_2 , ZrO_2 , and $\alpha\text{-Al}_2\text{O}_3$ (column 11, lines 60-64).

11. Claims 5, 6, 19, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakamoto in view of Steffen, and further in view of McNulty et al. (US 2002/0180351) (hereinafter McNulty).

With respect to claim 5, Sakamoto as modified by Steffen teaches all of the limitations of claim 1 above.

Sakamoto as modified by Steffen fails to teach that said silicone molding compound contains a conversion material that absorbs at least a portion of an electromagnetic radiation of a first wavelength range emitted by the semiconductor chip and/or received by the semiconductor component and emits electromagnetic radiation of a second wavelength range that is different from the first wavelength range. McNulty teaches that a silicone molding compound contains a conversion material (phosphor) that absorbs at least a portion of an electromagnetic radiation of a first wavelength range emitted by the semiconductor chip and/or received by the semiconductor component and emits electromagnetic radiation of a second wavelength range that is different from the first wavelength range ([0002] – [0004], [0021]) in order to provide a low power consumption light source that can be used in the visible range [0002].

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the semiconductor component of Sakamoto as modified by Steffen with the conversion material of McNulty for the benefit of providing a low power consumption light source that can be used in the visible range.

With respect to claim 6, Sakamoto as modified by Steffen teaches all of the limitations of claim 1 above.

Sakamoto as modified by Steffen fails to teach that the semiconductor chip emits electromagnetic radiation in the blue or ultraviolet region of the spectrum. McNulty teaches that a semiconductor chip emits electromagnetic radiation in the blue or ultraviolet region of the spectrum in order to provide a low power consumption light source that can be used in the visible range [0002].

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the semiconductor component of Sakamoto as modified by Steffen with the semiconductor chip of McNulty for the benefit of providing a low power consumption light source that can be used in the visible range.

With respect to claims 19 and 20, McNulty teaches that the semiconductor chip emits electromagnetic radiation in the blue or ultraviolet region of the spectrum [0008].

12. Claims 13-15 and 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakamoto in view of Steffen and Bank, and further in view of McNulty.

With respect to claims 13-15, Sakamoto as modified by Steffen and Bank teaches all of the limitations of claims 2-4 as addressed above.

Sakamoto as modified by Steffen and Bank fails to teach that said silicone molding compound contains a conversion material that absorbs at least a portion of an electromagnetic radiation of a first wavelength range emitted by the semiconductor chip and/or received by the semiconductor component and emits electromagnetic radiation of a second wavelength range that is different from the first wavelength range. McNulty teaches that a silicone molding compound contains a conversion material (phosphor) that absorbs at least a portion of an electromagnetic radiation of a first wavelength range emitted by the semiconductor chip and/or received by the semiconductor component and emits electromagnetic radiation of a second wavelength range that is different from the first wavelength range ([0002] – [0004], [0021]) in order to provide a low power consumption light source that can be used in the visible range [0002].

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the semiconductor component of Sakamoto as modified by Steffen and Bank with the conversion material of McNulty for the benefit of providing a low power consumption light source that can be used in the visible range.

With respect to claims 16-18, Sakamoto as modified by Steffen and Bank teaches all of the limitations of claims 2-4 as addressed above.

Sakamoto as modified by Steffen and Bank fails to teach that the semiconductor chip emits electromagnetic radiation in the blue or ultraviolet region of the spectrum. McNulty teaches that a semiconductor chip emits electromagnetic radiation in the blue or ultraviolet region of the spectrum in order to provide a low power consumption light source that can be used in the visible range [0002].

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the semiconductor component of Sakamoto as modified by Steffen and Bank with the semiconductor chip of McNulty for the benefit of providing a low power consumption light source that can be used in the visible range.

Allowable Subject Matter

13. Claims 9 and 31-37 are allowed.
14. As allowable subject matter has been indicated, applicant's reply must either comply with all formal requirements or specifically traverse each requirement not complied with. See 37 CFR 1.111(b) and MPEP § 707.07(a).
15. The following is a statement of reasons for the indication of allowable subject matter: regarding claims 9 and 31-37, the prior art does not disclose or suggest the claimed method of making multiple radiation-emitting and/or radiation receiving semiconductor components, particularly characterized by multiple semiconductor components and an injection channel that is led through each of the multiple semiconductor components, wherein silicone molding compound is injected into respective cavities of an injection mold through *the injection channel* (*i.e.*, a single injection channel).

Response to Arguments

16. Applicant's arguments with respect to claims 1, 40, and their dependencies have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to W. Wendy Kuo whose telephone number is (571)270-1859. The examiner can normally be reached Monday through Friday 7:00 AM to 4:30 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sue A. Purvis can be reached on (571) 272-1236. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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